AMENDMENTS IN THE SPECIFICATION

BACKGROUND OF THE INVENTION

1. Please amend the second paragraph on page 1, lines 9 through 10, to read as follows:

To enable them to function, they must, for technical reasons, generally be produced in the open position.

2. Please amend the paragraph bridging pages 1 through 2, from lines 6 through 12, to read as follows:

"Moreover, this closure part is so close to the pouring opening that it blocks ~~said~~ the opening visually. From the point of view of injection moulding ~~too~~, these closures are not without problems.

3. Please amend the paragraph bridging pages 2 through 3, from lines 10 through 11, to read as follows:

Problems with the flow paths and poor design during moulding are further weaknesses.

SUMMARY OF THE INVENTION

4. Please amend the paragraph bridging pages 3 through 4, from lines 1 through 2 on page 4,

to read as follows:

~~This object is~~ These and other objects may be achieved by the invention defined in the Patent Claims.

DETAILED DESCRIPTION OF THE INVENTION

5. Please amend the paragraph bridging pages 6 through 8, from line 31 on page 6 through line 18 on page 8, to read as follows.

Figure 2 schematically shows a closed injection moulded closure 20 according to the invention disclosed here. The closure 20 consists of a lower closure part 21 and an upper closure part 22, which is shown here in the closed position in which it is also produced. According to the invention, the closure 20 shown here has (in contrast to the prior art) no main hinge connection (~~cf.~~ see Figure 1) between the closure parts 21 and 22. The closure parts 21 and 22 are instead actively connected to one another by two, preferably symmetrically formed, connecting elements 23.1 and 23.2 (owing to the direction of view, only one connecting element 23.1 is visible) and four hinge connections 24.1, 24.2, 25.1 and 25.2. ~~Two hinge connections 24.1, 25.1 and 24.2, 25.2 each border an element 23.1 and 23.2, respectively, on non-adjacent sides and connect it to the closure parts 21 and 22, respectively. The hinge connections 24.1 and 25.1, and 24.2 and 25.2, respectively, make an angle ϕ (cf. also Figure 3) with one another.~~ The two connecting elements 23.1 and 23.2 are connected to the upper closure part 22 through first hinge connections 25.1 and 25.2 and to the lower

closure part 21 through second hinge connections 24.1 and 24.2. The first hinge connection and the second hinge connection make an angle ϕ with each other. ~~The two~~ Two planes defined by the two pairs of hinge connections 24.1 and 25.1, and 24.2 and 25.2, respectively (not shown) in turn make an angle ω. By varying the angles ω and ϕ and their ratio to one another, the snap-on effect and an opening angle α of the closure are determined. The relationship between the opening angle α and the angles ω and ϕ is given by the following formula:

$$\phi = 2 \cdot \arctan\left[\frac{\sin(\alpha/2)}{1-\cos(\alpha/2)} \cdot \sin(\omega/2)\right]$$

To be able to produce the closure 20 in the closed position, the connecting elements 23.1 and 23.2 and the hinge connections 24.1, 24.2, 25.1 and 25.2 are arranged in such a way that they are accessible in the mould from the inside of the closure (arrow 27) and from the outside of the closure (arrow 28) and can be removed from the mould. For this purpose, the connecting elements 23.1, 23.2 and the associated hinge connections are arranged in a surface which is inclined relative to the closure axis "A". Preferably, hinges according to the patents EP 0 746 512, PCT/EP96/2780 or the Patent Application PCT/1999/00277 of the same Applicant are used for the closure, the contents of which are hereby incorporated by reference with regard to the details of the design of the hinges.

Particularly in the case of closures having curved contours in which the connecting elements 23.1, 23.3 have a corresponding convexity or curvature owing to their contour integration, the hinge according to PCT/EP96/2780 is advantageous since the elastic strain of the longer free edges 46.1 and 46.2: (See Figure 3) under tension has the desired snap-on effect.

6. Please amend the paragraph bridging pages 8 through 9, from line 20 on page 8 through line 5 on page 9, to read as follows.

A typical open position of the upper closure part 22 is represented by ~~an upper closure part 29~~ the dotted line in Fig. 2. ~~The corresponding open positions of the element 23.1 or 23.2 and of the hinge connection 25.1 or 25.2 are represented by an element 30.1 or 30.2 and a hinge connection 31.1 or 31.2.~~ By avoiding a main hinge connection between the closure parts 21 and 22, it is possible to arrange the upper closure part 22 in its open position ~~(upper closure part 29)~~ in such a way that an optimal and, if required, predeterminable opening angle and an adjustable snap-on effect result. The predetermined opening angle is preferably in the range from 150° to 180° but may also be adapted to other requirements. On comparison of the closures shown in Figure 1 (prior art) and Figure 2 ~~(invention)~~, the surprising importance of the invention disclosed here for closures produced in the closed state will become clear to the person skilled in the art.

7. Please amend paragraph 1 bridging pages 9 through 11, page 9, line 7 through page 11, line 17, to read as follows:

Figure 3 shows an embodiment of a closure 20 according to the invention in a perspective view. A lower closure part 21 and an upper closure part 22 can be seen. These are connected to one another by means of two connecting elements 23.1 and 23.2 and four hinge connections 24.1, 24.2 and 25.1, 25.2~~, respectively, which border said elements~~. The two pairs of hinge connections 24.1 and 25.1, and 24.2 and 2S.2, respectively, ~~each together~~ define a first plane 31 ~~or~~ and a second plane 32, respectively, and make an angle ϕ, with each other~~with one another~~. Shorter free edges 45.1 and 45.2 closer to the apex of the angle are preferably substantially pressure-resistant. The planes 31 and 32 in turn make a solid angle ω with one another. The planes 31 and 32 are inclined relative to the closure axis "A" in such a way that they are further away from the closure axis "A" in the region of the lower connection (lower closure part 21) than in the region of the upper connection (upper closure part 22). This permits demouldability of the closure while also making it possible to form the desired hinge. In the embodiment shown, the connecting elements 23.1, 23.2 are integrated into a convex outer contour of the closure, with a ~~corresponding~~ an included angle ω of less than 180° between the planes 31 and 32. In other embodiments having a concave outer contour, an included angle ω of greater than 180° is enclosed between the two planes 31, 32. The hinge connections 24.1, 24.2 and 25.1, 25.2 are preferably film hinges as known from the prior art. The desired bending ranges can however also be different. In the closed position shown here, the closure 20 is preferably produced by means of injection moulding. The closure parts 21, 22 and the connecting elements

23.1, 23.2 and the hinge connections 24.1, 24.2, 25.1, 25.2 are functionally separated from one another here by ~~all-round~~ intervening gaps 33 to 38 so that the movable upper closure part 22 can assume at least two spatially defined and stable positions relative to the lower closure part 21. There are unstable states (dead points) between these stable positions so that the upper closure part 22 automatically attempts to achieve the nearest stable position and hence has a snap-on effect. In certain stable positions, in particular in the closed position of the closure 20 shown here, the closure parts 21, 22, the connecting elements 23.1, 23.2, the hinge connections 24.1, 24.2, 25.1, 25.2 are in substantially stress free states (geometric deformations). In addition to these stress-free, stable positions, non-stress-free stable positions are also possible. In these positions, the connecting elements 23.1 and 23.2 and the hinge connections 24.1, 24.2, 2S.1, 25.2 are typically under a torsional stress and the secondary stresses caused thereby. The connecting elements 23.1 and 23.2 are formed along a shorter free edge 45.1 or 45.2 in such a way that they do not buckle under the pressures occurring. The longer free edges 46.1 and 46.2 are preferably designed in such a way that they lengthen elastically and reversibly under the tensile stresses occurring. This can be achieved, for example, by a three-dimensional curvature or specific choice of material. The closure parts 21 and 22 advantageously have a certain elasticity so that, if required, they undergo reversible elastic deformation under the loads occurring. The connecting elements 23.1 and 23.2 are advantageously formed in such a way that they deform in a controlled manner owing to the torsional forces occurring. The coordination between the closure parts 21 and 22 is adjustable through the torsional rigidity of the connecting elements 23.1, 23.2. The desired snap-on effect can thus be achieved by the closure parts or by the connecting elements individually or in combination with one another.

Owing to the low torsional rigidity of the connecting elements 23.1 and 23.2, it is possible to achieve intermediate states in which the closure parts are stable relative to one another but do not assume tension-free positions. Closures having a plurality of open positions can thus be realized.

8. Please amend a paragraph bridging pages 11 through 12, page 11 line 19 through page 12 line 28, to read as follows:

The closure parts are separated from one another by the gaps 33 to 38 so that the closure 20 can be opened and closed. The gaps 33 to 38 are formed in such a way that they are optimally accessible in the mould and can be removed from the mould. ~~Elements~~ Coupling elements 39 are present in the gap 33 of the embodiment shown here. ~~Said~~ The coupling elements additionally connect the closure parts 21 and 22. The coupling elements 39 are designed in such a way that, if required, they serve as predetermined breaking points between lower closure part 21 and upper closure part 22 which are destroyed when the closure is first opened. The coupling elements 39 may also be in the form of all-round, membrane-like predetermined breaking points which enclose one or more desired sectors. A consumer can thus recognize whether the closure has already been opened before purchase (original warranty seal). The coupling elements 39 also serve for preventing unintentional opening during transport, since a greater force has to be overcome on opening for the first time. In addition to the above-mentioned points, the coupling elements 39 also serve as flow aids in the production of the closure 20, in order to achieve better filling of the mould. Instead of the coupling elements 39, other equivalent means (not shown) are also possible, for example in the

form of tearoff lips, which have to be removed before opening for the first time, for example by tearing off. Integrations of further functions are not hindered. The course of the gaps 33 to 38 can be substantially freely chosen provided that there is no impairment of the mode of operation of the closure and the producibility. The connecting elements 23.1 and 23.2 are preferably integrated into the outer contour of the closure parts 21 and 22. In the invention disclosed here, the design is subject to few limits, in contrast to the prior art. Here, the connecting elements 23.1 and 23.2 are adapted to the outer contour of the closure and are integrated therein. Of course, they may also have another design or may be flat. If required, they may have a connection to one another. An advantageous connection can be realized, for example, in the form of a further (straight) hinged connection, in the form of a film hinge in the case of plastics.

9. Please amend a paragraph bridging pages 12 through 14, page 12 line 30 through page 14 line 1, to read as follows:

Figure 4 shows the closure 20 according to Figure 3 in the opened position, in a perspective sectional view. Here, the closure 20 is pressed onto a bottle 50 and thereby fastened. Here, the upper closure part 22 is present in a stable open position swivelled 180° backwards so that a pouring opening 51 for pouring out the content contained in the bottle 50 is unobstructed. In the embodiment shown here, the upper closure part 22 is present in an oblique position above the lower closure part 21 so that it does not hinder pouring and the spout 51 is visually not concealed. Because the main hinge connection has been avoided according to the invention and owing to the length of the

connecting elements 23.1, 23.2, it is possible to bring the upper closure part 22 into this position in a closed injection moulded closure 20. In the case of the closures known from the prior art, an upper closure part generally hinders pouring. The coupling elements 39 were destroyed here on deliberately opening the closure 20. Residues of the coupling elements 39 are therefore present both on the lower closure part 21 and on the upper closure part 22. It is thus safely indicated to a user that the closure 20 was opened at least once. The closure parts 21, 22, the connecting elements 23.1, 23.2, and the hinge connections 24.1, 24.2, 25.1, 25.2 are advantageously substantially tension-free in the open position of the closure 20 shown here. This means that the closure parts 21, 22, the connecting elements 23.1, 23.2 (except for the hinge connections 24.1, 24.2, 25.1, 25.2) are not subject to any deformations. In the interior of the closure 23, preferably in the region of the connecting elements 23.1 and 23.2, ~~means~~ brace 52 for partial stiffening of the closure parts 21, 22, 23.1, 23.2 are present on the closure parts 21, 22, 23.1, 23.2. The snap-on behaviour and the functionality of the closure 20 are thus influenced in a controlled manner. ~~Means~~ Brace 52 ~~used~~ for stiffening the closure parts ~~are~~ is preferably ~~ribs, thicker regions~~ constructed as a rib, thicker region or other~~;~~ equivalent ~~means~~ structural element.

10. Please amend a paragraph bridging pages 14 through 15, page 14 line 3 through page 15 line 14, to read as follows:

A tubular element 53 which in this case has an edge 55 thickened ~~by means of~~ with a bead 54 is evident in the interior of the upper closure part 22. The tubular element 53 or the bead 54 corresponds, in a closed position of the closure 20, to the spout 51 of the bottle 50 or of an adapter

between bottle and closure so that ~~said~~ bottle 50 is sealed. The tubular element 53, the bead 54 and the spout 51 actively connected to them in the closed position of the closure 20 are advantageously designed in such a way that the sealing effect is adjusted proportionally to the internal pressure of the bottle 50. This can be achieved, for example, through the geometry of the tubular element 53 if the edge 55 or the bead 54 expands proportionally to the internal pressure and to a greater extent than the increase in the diameter of the spout 51. Consequently, the edge 55 is pressed to a greater extent against the inner wall 56 of the spout 51 with increasing internal pressure, with the result that the sealing effect is enhanced. ~~Active element~~ A catch 57 is present on the inside of the upper closure part 22. In the closed position of the closure 20, this ~~active element~~ catch 57 has an active connection to a counter-element, in this case an outer edge 58 of the bottle 50, by virtue of the fact that it grips under ~~said~~ counter-element 58 and thus prevents unintentional opening of the closure 20, for example during transportation or in the case of high internal pressures. This locking mechanism can be temporarily released here by lateral pressure on the upper closure part 22 in the direction of the arrows 59 and 60. As a result of the lateral pressure, the upper closure part is deformed in such a way that the catch 57 moves in the direction of an arrow 61 and the active connection with the outer edge 58 is temporarily broken. The closure 20 can thus be opened. The locking mechanism shown here is also particularly suitable for combination with a quality seal or original warranty seal in the form of a tearoff lip (not shown). Of course, it is also possible to use more than one catch 57 or to position said catch otherwise. The effective ranges of the pressures must be appropriately adjusted. Thus, the closure according to the invention can be used even in the case of high internal pressures.

11. Please amend a paragraph bridging pages 15 through 16, page 14 line 16 through page 16 line 11, to read as follows:

Figure 5 shows another embodiment of a closure 1 which is mounted on, preferably forced onto, a container 12. The closure comprises a first, fixed closure part 62 and a second, movable closure part 63. The container 12 may have, in the region of its upper end 67, a complete opening which substantially extends over its total cross-section, or, in the region of the movable closure part 63, by a smaller opening which appears as soon as the movable closure part 63 opens. Arranged in the region of the transition 68 between the two closure parts are two connecting elements 23.1, 23.2, which form the hinge connection between the two closure parts. In contrast to the closures described above, the connecting elements are arranged not by the side of the closure in an inclined surface but on the top of the closure (relative to the closure axis "A"). The geometry of the two connecting elements 23.1, 23.2 is preferably designed so that the movable closure part performs a snap-on movement of about 90° or 180°, the formula mentioned above in association with Figure 2 being used to obtain the desired opening angle α. Of course, it is also possible to obtain other intermediate angles by corresponding modification of the hinge connections 24.1, 25.1 and 24.2, 25.2. The avoidance, according to the invention, of a main hinge in combination with the mutual arrangement of the closure parts permits such a closure having a large opening angle α, as illustrated in Figure 2.